

ABSTRACT OF THE DISCLOSURE

A method and apparatus for performing nickel salicidation is disclosed. The nickel salicide process typically includes: forming a processed substrate including partially fabricated integrated circuit components and a silicon substrate; incorporating 5 nitrogen into the processed substrate; depositing nickel onto the processed substrate; annealing the processed substrate so as to form nickel mono-silicide; removing the unreacted nickel; and performing a series procedures to complete integrated circuit fabrication. This nickel salicide process increases the annealing temperature range for which a continuous, thin nickel mono-silicide layer can be formed on silicon by 10 salicidation. It also delays the onset of agglomeration of nickel mono-silicide thin-films to a higher annealing temperature. Moreover, this nickel salicide process delays the transformation from nickel mono-silicide to higher resistivity nickel di-silicide, to higher annealing temperature. It also reduces nickel enhanced poly-silicon grain growth to prevent layer inversion. Some embodiments of this nickel salicide process may be used 15 in an otherwise standard salicide process, to form integrated circuit devices with low resistivity transistor gate electrodes and source/drain contacts.